

February 2021

# **SPIRE GLOBAL, INC.**

**CubeSat-Based Earth Observations**

**Operational Global Weather Forecasts**

**AIS Global Maritime Tracking**

**ADS-B Global Aviation Tracking**

**Hosted Payloads and Custom CubeSats**

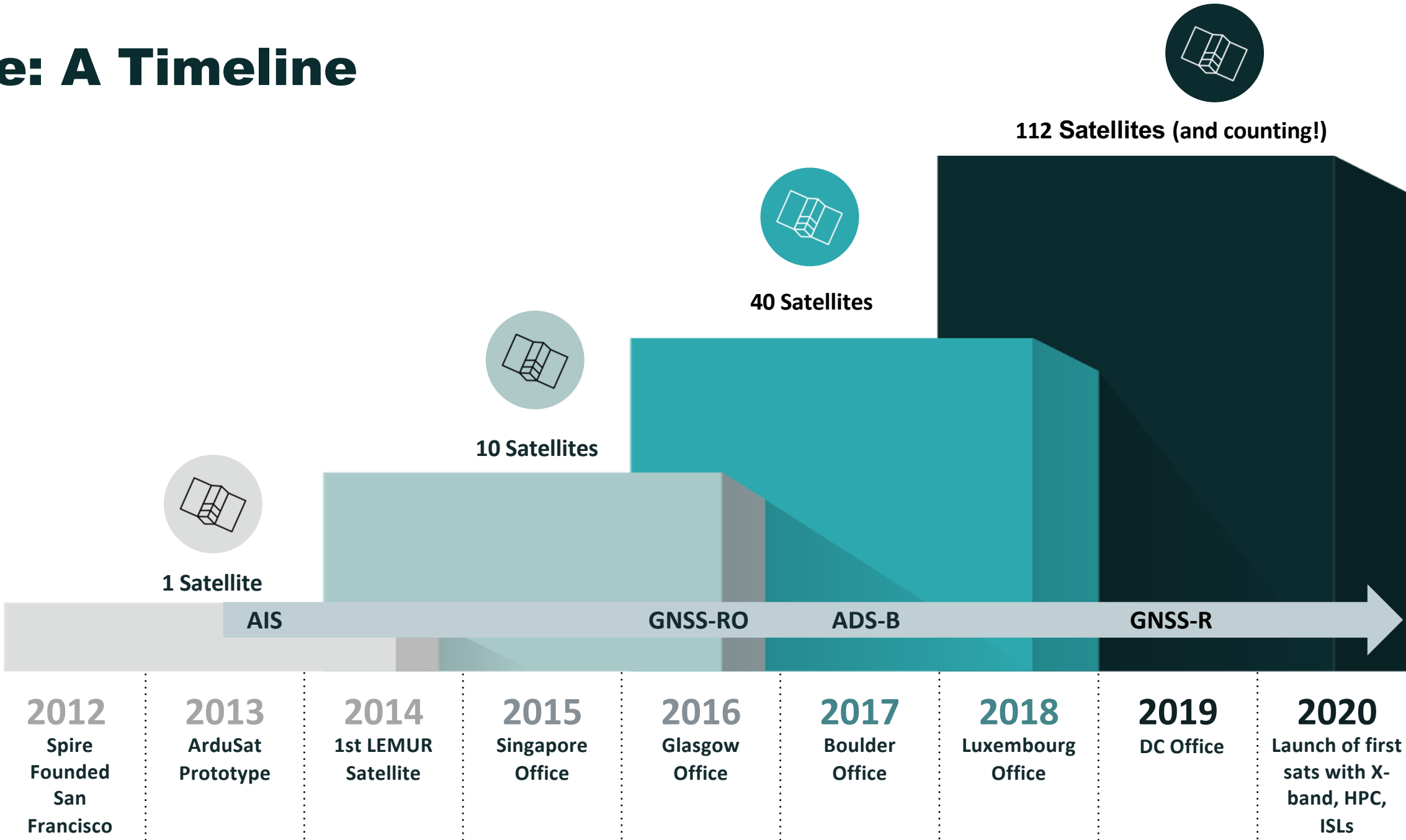
**Steve Moran and Will Cromarty**  
**Account Executives**  
**Federal Civil Agencies**

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# Spire: A Timeline





# Spire: Key Markets

- *SPIRE EARTH INFORMATION* - Collecting data from beneath the Earth's surface to the edge of the atmosphere and beyond to improve operational weather and space weather forecasts and to support weather, climate, and environmental research
- *SPIRE WEATHER* - Setting a new benchmark in the commercial weather industry, with in-house, multi-model numerical weather prediction capability driven by Spire's GNSS-RO atmospheric data
- *SPIRE MARITIME* - Revolutionizing how maritime data is collected, analyzed, and delivered to solve industry challenges and provide customers a competitive advantage
- *SPIRE AVIATION* - Solving the needs of the aviation and logistics industries with enhanced position data that fills gaps in areas that are out of reach of existing terrestrial systems
- *SPIRE ORBITAL SERVICES* - Accommodating new customer payloads quickly and efficiently, allowing for an incredibly fast rollout of new capabilities. Spire's flexible and consistent launch schedule, as well as the ability to design, assemble, test, and operate LEMUR satellites in-house, allows new sensors to go from design to launch in as little as 6 months.



# Spire LEMUR Orbital Inclinations

**112 LEO-Based CubeSats in a diverse set of orbits enabling...**

**...high daily revisit, redundancy, and low latency**



# World's Largest Ground Station Capability

*We own and operate the largest and most geographically dispersed network of ground stations, which allows us to downlink our satellite-generated data at record speed*





February 2021

# Spire Earth Information

CubeSat-Based Earth Observations for  
Weather, Climate, and Environmental  
Research



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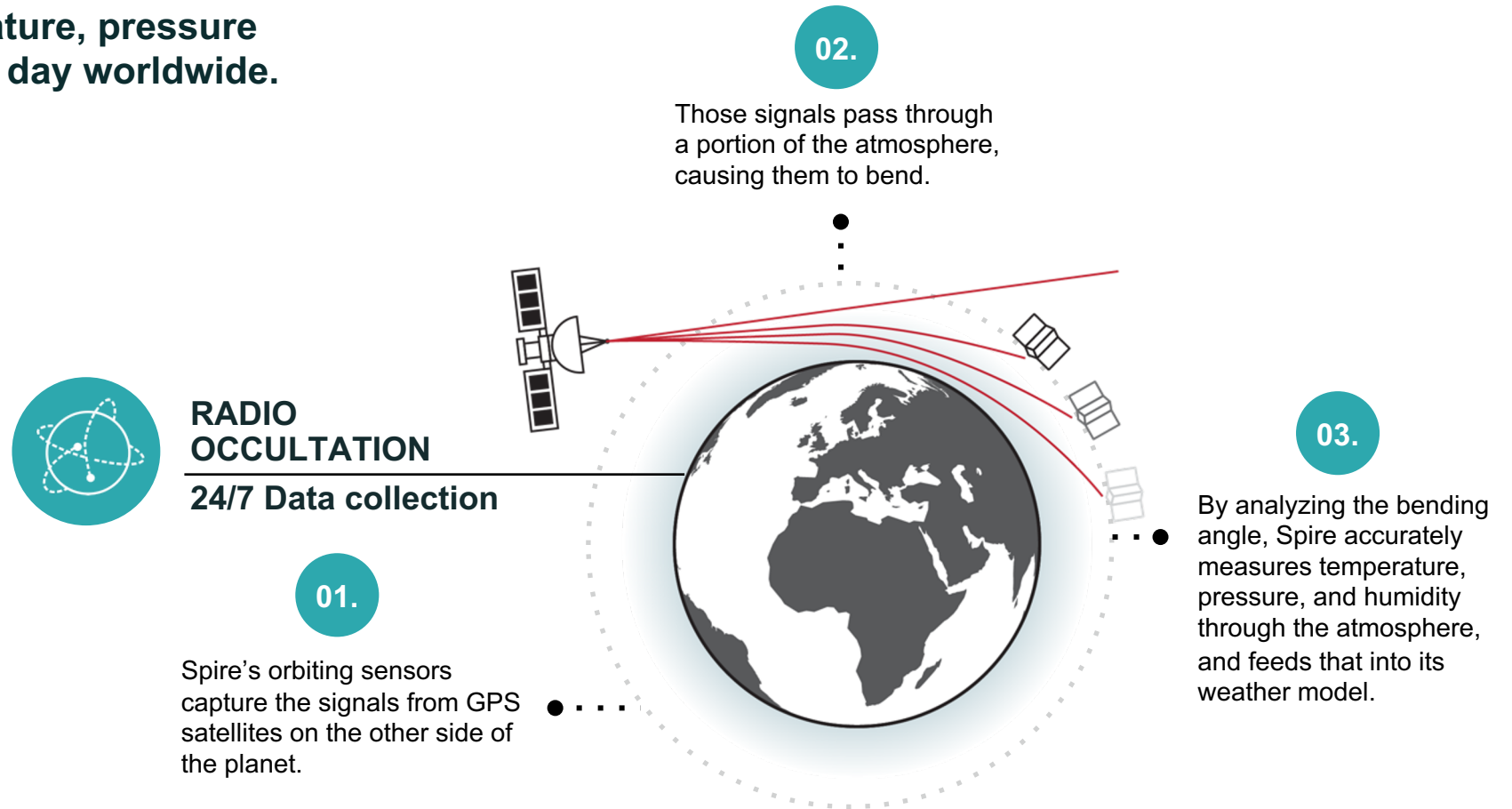


# RADIO OCCULTATION - AN UNBIASED WEATHER MEASUREMENT



Our satellites can measure temperature, pressure and humidity over 10,000 times per day worldwide.

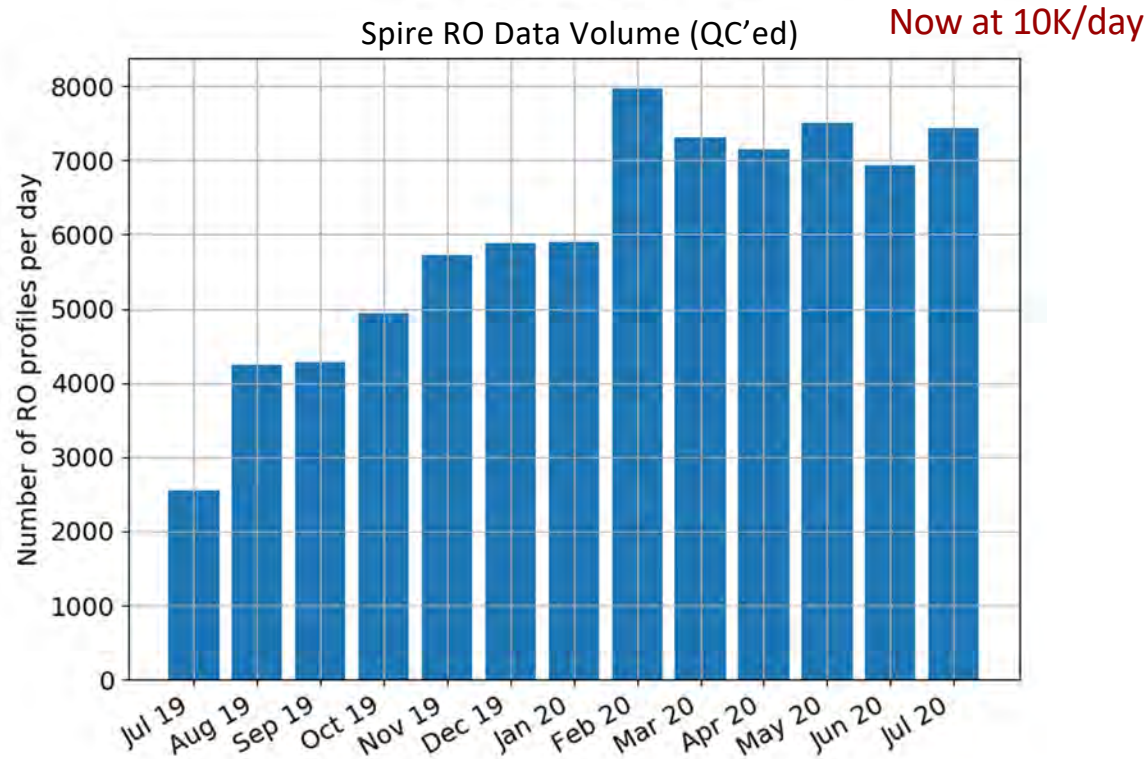
- Spire collects weather data from the atmosphere via our advanced software-defined (SDR) GNSS receiver for remote sensing & precise orbit determination
- High-quality GNSS profiles through the boundary layer; multi-GNSS constellation capabilities
- **Applications:** Weather model assimilation of RO, Space Weather monitoring, Ionosphere corrections for navigation, Thermospheric density (POD), etc.
- **Key Features:** High Accuracy, Low Data Latency, High Data Spatial Resolution, High Reliability, High Quality



*GNSS-RO contributes to forecast accuracy and is validated by ECMWF and leading academic institutions*

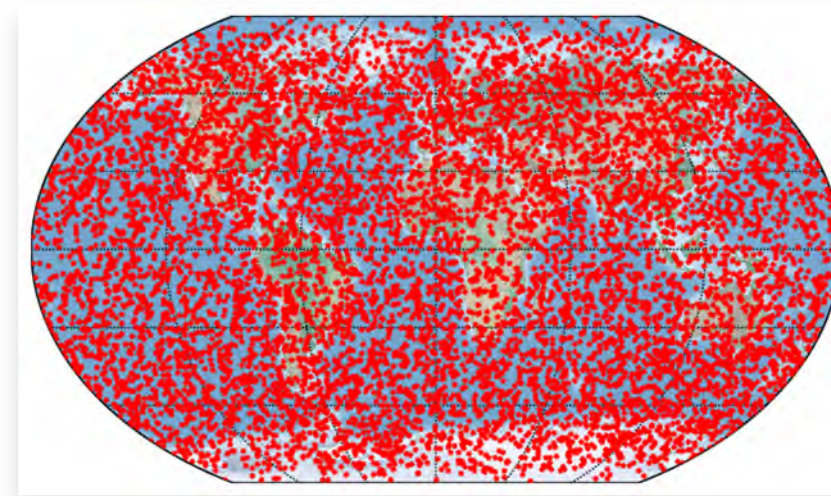


# Unmatched GNSS-RO Volume and Coverage

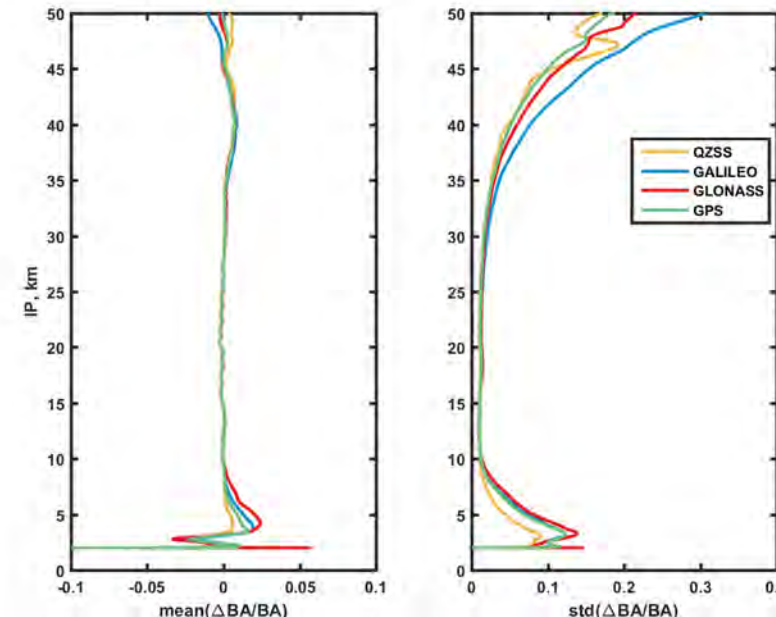


## RO Production Advancement:

- First commercial provider of four constellations and the only provider of Galileo and QZSS data
- Quantity increase through launches and additional GNSS constellations tracked
- Continual receiver and bus performance improvements
- Continual data latency reduction



~10K raw profiles per day and global coverage



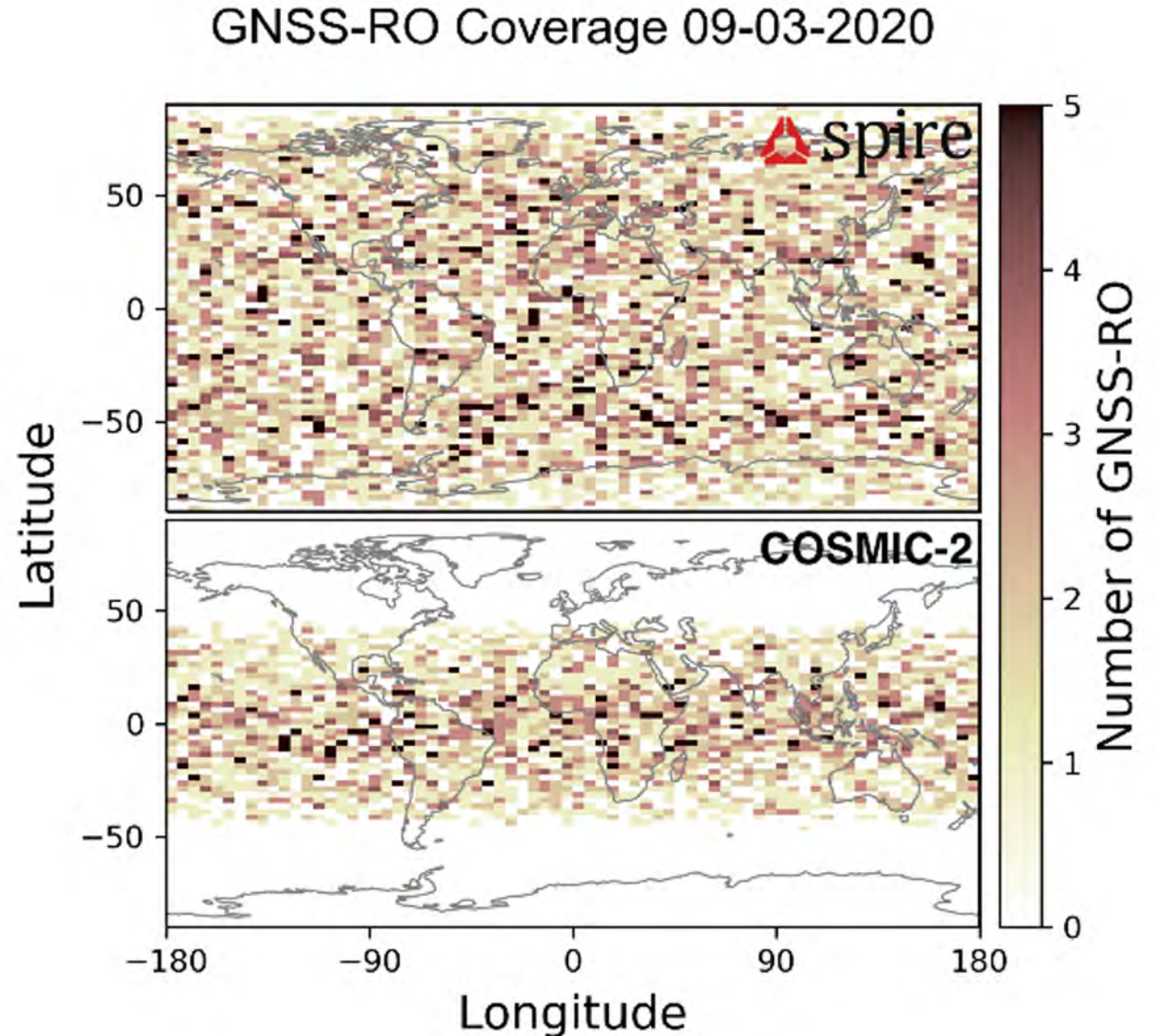
Spire RO difference statistics vs. ECMWF match current operational RO missions



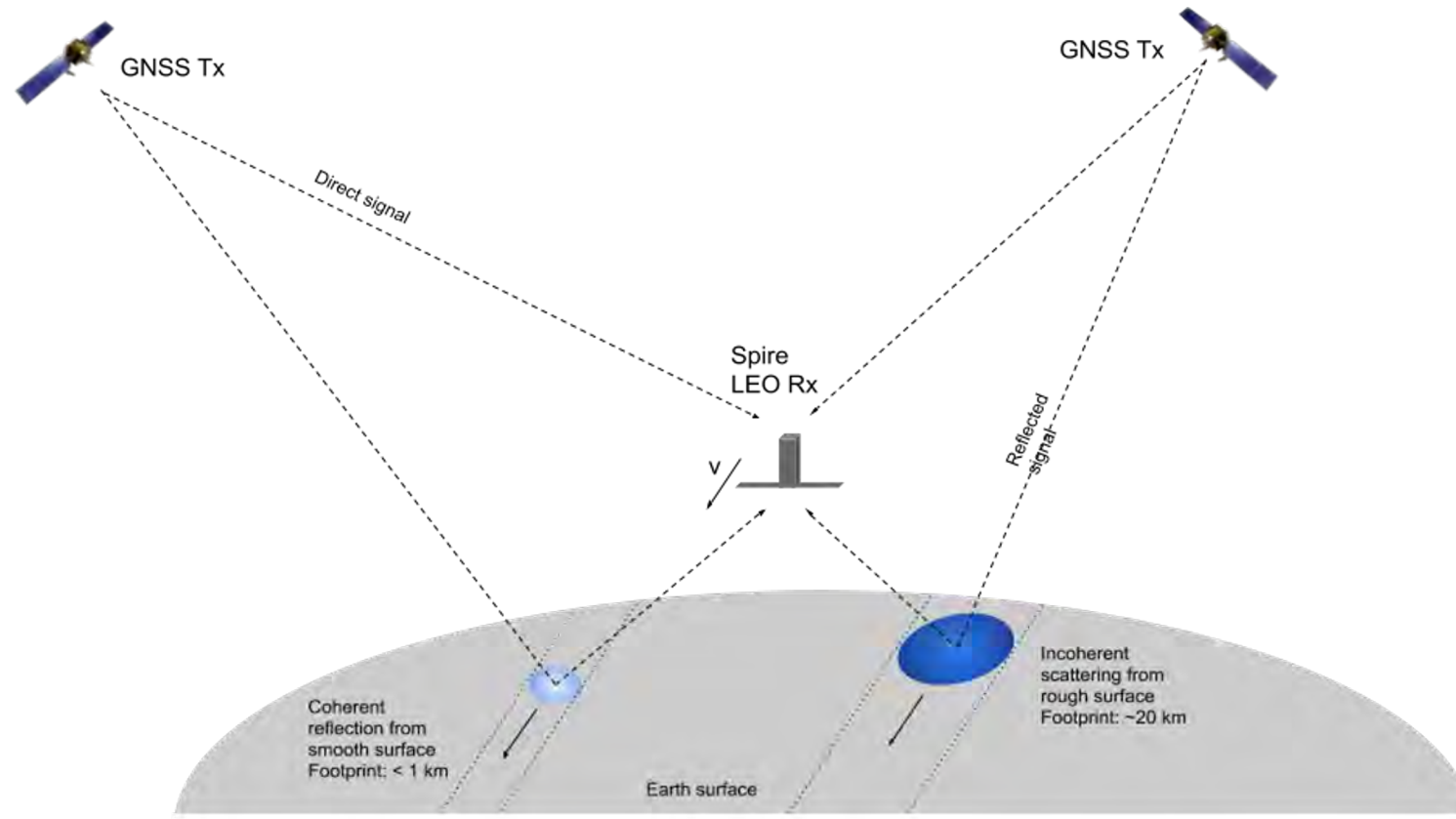


# Space Weather Measurements

- Ionospheric information is derived from GNSS signals
- Spire provides observations
  - in data denied areas
  - with low-latency
- Different scales
  - Global
    - Slant total electron content (TEC)
  - Mid-scale
    - Sporadic E, traveling ionospheric disturbances
  - Small scale
    - Scintillation events



# GNSS-R Observations



GNSS-R is a form of bistatic radar using GNSS signals of opportunity (e.g., GPS, Galileo, QZSS, GLONASS) to perform Earth surface scatterometry (reflectivity and roughness estimation similar to NASA's CYGNSS mission, producing soil moisture, flood inundation, ocean surface roughness and winds, altimetry, and sea ice characterization data products)

***Natural progression from successful Spire radio occultation (RO) satellites to add GNSS-R scatterometer satellites to Spire constellation***





# Spire Earth Information

## NASA's Commercial Smallsat Data Acquisition Program (CSDAP)

---

### CSDAP Blanket Purchase Agreement (BPA) Task Order 5 awarded May 14, 2020

- Period of Performance is 12 months
- Includes 2 data deliverables
  - ❑ 6 months of historical Earth observation data (11/1/2019 – 4/30/2020)
  - ❑ 12 months of daily access to 1-month latent Earth observation data (5/1/2020 – 4/30/2021)
- Spire's CSDAP Data Product Catalogue includes
  - ❑ GNSS Radio Occultation (RO) Observations
  - ❑ GNSS Reflectometry Observations
  - ❑ Grazing Angle GNSS-R Observations
  - ❑ Grazing Angle GNSS-R Sea Ice
  - ❑ Grazing Angle GNSS-R Altimetry
  - ❑ Precise Orbit Determination (POD) Satellite Orbits
  - ❑ Ionospheric Total Electron Content (TEC)
  - ❑ Ionospheric Electron Density
  - ❑ Ionospheric Scintillation
  - ❑ Magnetometer Observations
- CSDAP data is available to NASA and NASA-funded researchers





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# Spire Weather

Operational Global Numerical Weather  
Prediction Powered by GNSS-RO



Spire proprietary – disclosure subject to restrictions on cover page.





# Spire Weather Overview

## Operational Global Weather Forecasts

**Spire's proprietary numerical weather prediction models combine our RO data, NOAA and ECMWF data, satellite images and other observations to produce...**

### Global Vertical Weather Forecasts



Weather forecast data in flight levels (100 to 450) or in isobaric level (up to 80,000+ feet)

### Global Horizontal High-Resolution Grid



Forecasts covering the entire planet in 1/8-th degree resolution (~12km), allowing for visibility of weather events on a local and global basis bridging gaps in under-observed areas.

### 50+ Customized Weather Variables



A complete set of weather variables

### Short & Medium Range Forecasts



**Short:** Forecast output every hour in the first 24 hours (4x/day)  
**Medium:** Every 6 hours up to 7 days (2x/day)  
**Hindcast:** Last 3 days or more

***Commercially available***

# Spire Weather Overview

## Weather Variable Bundles



### MARITIME

- Sea Surface Temperature
- Ocean Currents (eastward component)
- Ocean Currents (northward component)
- Significant Wave Height



### AVIATION

- Air temperature
- Relative humidity
- The eastward-component of the horizontal wind
- The northward-component of the horizontal wind
- The horizontal surface visibility
- The height where the maximum wind speed is found
- The eastward component of the maximum horizontal wind
- The northward component of the maximum horizontal wind
- Potential severity of clear-air turbulence associated with wind shear
- Potential for aircraft icing



### AGRICULTURE

- Air temperature
- Relative humidity
- The eastward-component of the horizontal wind
- The northward-component of the horizontal wind
- The horizontal surface visibility
- The height (above sea level) where the maximum wind speed is found
- The eastward component of the maximum horizontal wind
- The northward component of the maximum horizontal wind
- Potential severity of clear-air turbulence associated with wind shear
- Potential for aircraft icing



### RENEWABLE ENERGY

- The eastward and northward components of wind at 80m
- The eastward and northward components of wind at 100m
- The eastward and northward components of wind at 120m
- Incoming shortwave radiation
- Air temperature



### THUNDERSTORM

- Convective Available Potential Energy at whole atmosphere
- Convective Inhibition at whole atmosphere
- Lifted Index
- Storm-relative helicity
- Storm motion (eastward component)
- Storm motion (northward component)
- 0-6 km shear vector (eastward component)
- 0-6 km shear vector (northward component)



### BASIC

- Air temperature at screen level
- Relative humidity
- Dewpoint temperature
- The eastward component of the horizontal wind at 10 meters AGL
- The northward component of the horizontal wind at 10 meters AGL
- Air pressure adjusted to mean sea level
- Accumulated precipitation at surface level
- Instantaneous wind gust speed at 10m

All bundles can be customized with additional variables



February 2021

# Spire Weather Case Studies

**Spaceport Operations**

**UAS/UAM Operations**

**Wildfire Management**



Spire proprietary – disclosure subject to restrictions on cover page.





# SPIRE SPACEPORT OPERATIONAL PICTURE

ALL-IN-ONE AIS, ADS-B, AND WEATHER DATA SOLUTION

## External Causes for Rocket Launch Delays - Weather & Unauthorized Vessels and Aircraft

Weather is the single greatest cause for launch delays and scrubs. Typical weather concerns include winds (both near the ground or high up in the atmosphere), clouds and lightning. In addition to weather, boats and planes straying into the launch zone can also cause a launch scrub.



**Unauthorized Vessels**  
Boats straying into restricted zone and not responding to communications



**Weather Systems**  
Wind, clouds, and lightning are the single greatest cause for launch delays and scrubs



**Unauthorized Aircraft**  
Aircraft entering no-fly zone and not responding to communications

## Typical Weather Concerns - Temperature, Wind, Clouds, and Lightning



Temps below 48 degrees F will force a scrub since cold weather can cause ice buildup on the rocket



High winds near the ground or in the atmosphere can cause a launch due to possible control problems of the rocket



A cloud layer that's thicker than 4,500 feet can extend to freezing temperatures aloft, endangering rocket's safety



NASA won't fuel a rocket if there's >20% chance of a lightning strike within a five mile radius of the launch site

## Spire Solution - AIS, ADS-B, and Hyper-Localized Weather Forecasts

Spire's unique data sets can be used to address each of the issues facing spaceport operators and launch service providers.

### AIS Data

Real-time, local AIS data including vessel MMSIs, vessel type and 8-hour Predict AI

### ADS-B Data

Real-time, local ADS-B data including ICAO and 4D/15 position information

### Weather Data

Hyper-localized weather forecast including temperature, winds at surface and flight levels, and cloud cover

*"Our solutions help our customers reduce mission costs and make more informed decisions."*



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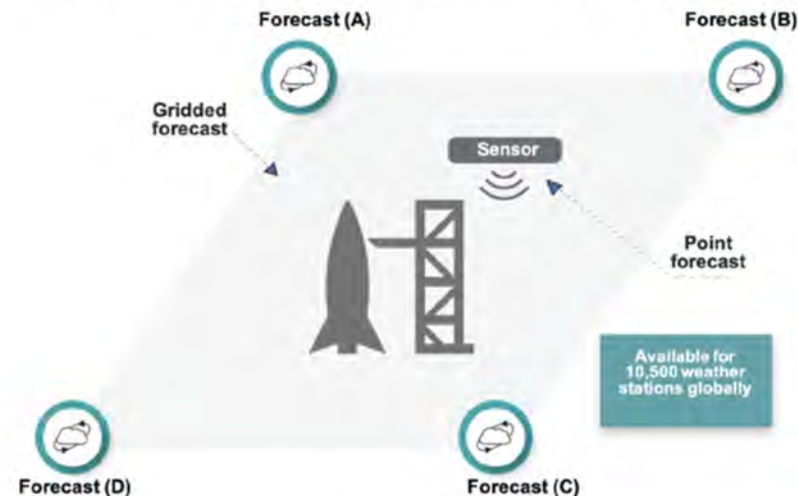
<https://spire.com/>

## Spire Point Optimized Weather Forecast

### Spire Point Optimized Weather Forecast For Spaceports

#### What is Spire's point optimized solution?

A localized, optimized point weather forecast for any location on Earth. Spire's point optimized solution uses local sensors and learns from historical weather data to create an optimized forecast for one single point. This optimized forecast takes into account local conditions, adjusting the weather predictions for that specific location to ensure the most accurate forecast possible.



### Point Optimized Variables

Point Optimized Weather Dataset - provides the most accurate weather forecast possible for a given point

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>- Air Temperature (2m AGL)</li> <li>- Relative humidity</li> <li>- Dewpoint Temperature</li> <li>- 24-hour Min/Max Temperature</li> <li>- 24-hour Probability of Precipitation</li> <li>- Surface wind speed &amp; direction</li> <li>- Surface visibility</li> </ul> | <ul style="list-style-type: none"> <li>- Cloud Cover Percentage</li> <li>- 1, 3, 6-hour Quantitative Precipitation Estimate</li> <li>- 1, 3, 6-hour Probability of Precipitation</li> <li>- Conditional Probability of Rain</li> <li>- Conditional Probability of Snow</li> <li>- Conditional Probability of Ice or Freezing Rain</li> </ul> | <ul style="list-style-type: none"> <li>- Probability of Fog</li> <li>- Probability of Thunderstorms</li> <li>- Cloud Ceiling</li> <li>- Surface Global Horizontal Irradiance*</li> <li>- Surface Direct Normal Irradiance*</li> <li>- Surface Plane-of-Array Irradiance* (*in development)</li> </ul> |
|--|--|---|



Spire locations with point optimization - available for over 10,500 weather stations

Includes all major US spaceports:

- Wallops Island
- Cape Canaveral
- Vandenberg Air Force Base
- Pacific Spaceport Complex (Kodiak)
- Mojave Air and Spaceport
- Edwards AFB



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## Spire AIS & ADS-B Data

### Spire Maritime & Aviation Solution for Spaceports

We offer seamless, space-based and terrestrial AIS & ADS-B tracking data delivered via our easy-to-use APIs. Our maritime and aviation coverage will provide you with total situational awareness around your launch site and launch vehicle. Real-time AIS and ADS-B data can enable alerts when vessels or aircraft enter the restricted zone around the launch site, and historical data can be used to identify entrants after the launch has occurred.

### We Support Our Customers By Providing:



Real-time vessel & aircraft coverage



Historical data to ID past entrants into AOI



Accurate - Easy-to-use flexible APIs



Predict AI to enable route calculations



Integrated with weather for total operational picture

### Unmatched Global Vessel and Aircraft Tracking Capabilities

#### AIS Data Features

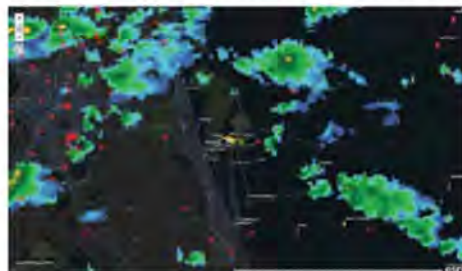
- **Vessels API:** Combines the AIS messages into one API and integrates positional data with static information into one report
- **Messages API:** Entire cleansed AIS data feed
- **Predict AI-Routing:** With ETA allows for more precise route calculations, optimal port management and refined forecasting
- **Historical Positions API:** Access to an archive of past positions for thousands of vessels
- **Enhanced Vessel Data:** 35 additional fields of vessel information

#### ADS-B Data Features

- **Data Stream:** Aircraft positions from both satellite and terrestrial sources; includes scheduled departure and arrival times
- **Historical:** Satellite data from December 2018, terrestrial data from January 2017
- **150M** aircraft position updates per day
- **50,000** aircraft tracked per day
- **Global coverage**, over oceans, mountains, and remote regions

### Unified Spaceport Management Tool - One Stop Shop for All Your Data Needs

Through our various visualization tools, Spire can offer a complete spaceport operational picture. Our AIS, ADS-B, and weather data can all be merged into one viewer, providing the end user with an optimal spaceport situational awareness tool. Spire data can also be ingested through our easy-to-use and integrable AIS, ADS-B, and weather data APIs.



AIS, ADS-B, and Weather data on Esri ArcGIS dashboard



Example Spire Weather data output (wind speed, wind direction, wind gust, and precipitation)



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## Spire Global Weather Forecast

### Spire Weather Forecast For Spaceports

#### What is Spire weather for spaceports?

A highly valuable and truly global weather forecast enriched with unique data from Spire's satellite constellation. Hyper-localized temperature, wind, cloud, and thunderstorm data provides critical insight to inform a go/no go launch decision. Our customized weather data pairs perfectly with maritime and aircraft tracking to provide a complete spaceport operational picture.



#### Reliable Weather Forecast

Spire's unrivaled radio occultation technology powers Spire's weather model. By frequently launching more satellites, Spire collects more radio occultations and continuously improves our weather forecasts.



#### Horizontal & Vertical Coverage

Spire satellites observe weather globally, from the ground up to 70,000 ft in very high vertical resolution (100m). This 3-D understanding of global weather guarantees unique capabilities to forecast weather at surface and in upper air.



#### Point Optimized Forecast

Spire can provide a hyper-localized forecast for a single point anywhere on Earth, offering a complete solution that covers an entire surface launch site through the complete path of the rocket in the upper air.

### Customized Weather Packages to Predict Weather Impacting Rocket Launches

Spire Weather offers many variables at various vertical levels that are particularly impactful for spaceport and launch vehicle operators.



#### Basic Bundle:

The most commonly used weather surface variables (most relevant variables in bold; 2m AGL if not specified)

- Temperature
- Min/Max Temperature (previous 6 hours)
- Relative humidity
- Dewpoint temperature
- Wind speed & direction (10m AGL)
- Wind gust speed (10m AGL)
- Cloud cover
- Mean sea-level pressure (sea level)
- Accumulated precipitation (surface)



#### Aviation Bundle:

Weather forecasts at specific flight levels, from 10,000 ft to 70,000 ft with forecasts for each variable every 1,000 ft

- Temperature
- Relative humidity
- Wind speed & direction
- Max winds (height, speed and direction at level of max wind)
- Icing severity
- Clear-air turbulence
- Surface visibility



#### Upper Air Bundle:

Specialized forecasts at 19 isobaric levels - from 1000 hPa to 20 hPa (translates to forecasts up to 80,000 ft)

- Temperature
- Relative humidity
- Wind speed & direction
- Geopotential height
- Vertical velocity
- Absolute vorticity
- Cloud water mixing ratio
- Cloud ice mixing ratio



#### Thunderstorm Bundle:

All of the information needed to evaluate thunderstorm conditions (at whole atmosphere if not specified)

- Convective Available Potential Energy (CAPE)
- Convective Inhibition (CIN)
- Storm motion (east and northward component, 0-6km)
- 0-6 km shear vector (east and northward component)
- Lifted Index
- Storm-relative helicity (0-3 km)
- Precipitable Water
- Lightning Prediction (in development)



#### High Resolution Grids

Available globally at 12 km resolution (1/8th degree). Covers the entire planet at the same high resolution.



#### Short And Medium Range Forecast

Short-range forecast: hourly output for 24h  
Medium-range forecast: 6-hourly output for up to 10 days



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## Spire Global Weather Forecast

### Spire Weather Forecast For Unmanned Aerial Systems (UAS)

#### What is Spire weather for UAS?

A highly valuable global weather forecast enriched with unique data from Spire's satellite constellation. Hyper-localized wind, cloud, and thunderstorm data up to altitudes of 80,000 feet provide critical insight to inform BVLOS UAS operations. Spire weather data also pairs with our aircraft tracking data to provide a complete operational picture of aviation assets and weather systems in your area of interest.



#### Reliable Weather Forecast

Spire's unrivaled radio occultation technology powers Spire's weather model. By frequently launching more satellites, Spire collects more radio occultations and continuously improves our weather forecasts.



#### Horizontal & Vertical Coverage

Spire satellites observe weather globally, from the ground up to 80,000 ft in very high vertical resolution (100m). This 3-D understanding of global weather guarantees unique capabilities to forecast weather at surface and in upper air.



#### Hyper-Localized Forecast

Leveraging our global forecast and data from local weather sensors, Spire can provide a hyper-localized forecast for a single point anywhere on Earth; includes optimization of wind speed and direction, fog and cloud ceiling.

### Customized Weather Packages to Predict Weather Impacting BVLOS UAS Operations

Spire Weather offers forecasts at various vertical levels, which can be leveraged to protect UAS assets as their use in urban areas and for transoceanic missions increases. Spire's ubiquitous global coverage provides access to weather forecasts even in denied areas.

Basic Bundle:	Aviation Bundle:	Upper Air Bundle:	Thunderstorm Bundle:
<p>The most commonly used weather surface variables (most relevant variables in bold; 2m AGL if not specified)</p> <ul style="list-style-type: none"> <li>- Temperature</li> <li>- Min/Max Temperature (previous 6 hours)</li> <li>- Relative humidity</li> <li>- Dewpoint temperature</li> <li>- Wind speed &amp; direction (10m AGL)</li> <li>- Wind gust speed (10m AGL)</li> <li>- Cloud cover</li> <li>- Mean sea-level pressure (sea level)</li> <li>- Accumulated precipitation (surface)</li> </ul>	<p>Weather forecasts at specific flight levels, from 10,000 ft to 70,000 ft with forecasts for each variable every 1,000 ft</p> <ul style="list-style-type: none"> <li>- Temperature</li> <li>- Relative humidity</li> <li>- Wind speed &amp; direction</li> <li>- Max winds (height, speed and direction at level of max wind)</li> <li>- Icing severity</li> <li>- Clear-air turbulence</li> <li>- Surface visibility</li> </ul>	<p>Specialized forecasts at 19 isobaric levels - from 1000 hPa to 20 hPa (translates to forecasts up to 80,000 ft)</p> <ul style="list-style-type: none"> <li>- Temperature</li> <li>- Relative humidity</li> <li>- Wind speed &amp; direction</li> <li>- Geopotential height</li> <li>- Vertical velocity</li> <li>- Absolute vorticity</li> <li>- Cloud water mixing ratio</li> <li>- Cloud ice mixing ratio</li> </ul>	<p>All of the information needed to evaluate thunderstorm conditions (at whole atmosphere if not specified)</p> <ul style="list-style-type: none"> <li>- Convective Available Potential Energy (CAPE)</li> <li>- Convective Inhibition (CIN)</li> <li>- Storm motion (east and northward component, 0-6km)</li> <li>- 0-6 km shear vector (east and northward component)</li> <li>- Lifted Index</li> <li>- Storm-relative helicity (0-3 km)</li> <li>- Precipitable Water</li> <li>- Lightning Prediction (in development)</li> </ul>



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#### Short And Medium Range Forecast

Short-range forecast : hourly output for 24h  
Medium-range forecast : 6-hourly output for up to 10 days



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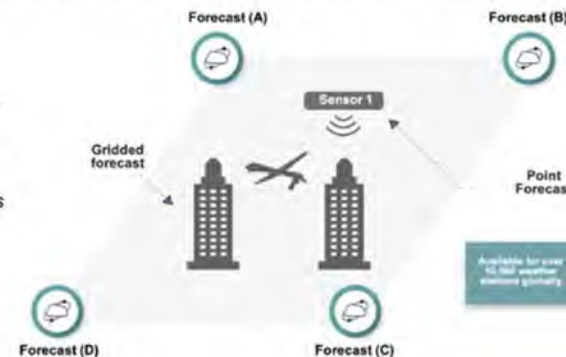
## Spire Point Optimized Weather Forecast & ADS-B Data

### Spire Weather Forecast For Unmanned Aerial Systems (UAS)

#### What is Spire's point optimized solution?

A localized, optimized point weather forecast for any location on Earth. Spire's point optimized solution uses local sensors and learns from historical weather data to create an optimized forecast for one single point. This optimized forecast takes into account local conditions, adjusting the weather predictions for that specific location to ensure the most accurate forecast possible.

Spire's point optimized solution can help UAS operators predict the location and intensity of dangerous and destructive pockets of wind turbulence and urban wind canyons, both critically important as UAS operations in populated urban environments increase.



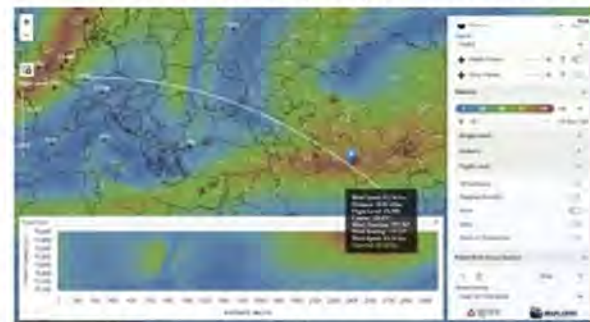
#### Point Optimized Variables

Point Optimized Weather Dataset - provides the most accurate weather forecast possible for a given point

- |  |  |  |
|--|--|--|
| - Air Temperature (2m AGL)             | - Cloud Cover Percentage                           | - Probability of Fog                                   |
| - Relative humidity                    | - 1, 3, 6-hour Quantitative Precipitation Estimate | - Probability of Thunderstorms                         |
| - Dewpoint Temperature                 | - 1, 3, 6-hour Probability of Precipitation        | - Cloud Ceiling  |
| - 24-hour Min/Max Temperature          | - Conditional Probability of Rain                  | - Surface Global Horizontal Irradiance*                |
| - 24-hour Probability of Precipitation | - Conditional Probability of Snow                  | - Surface Direct Normal Irradiance*                    |
| - Surface wind speed & direction       | - Conditional Probability of Ice or Freezing Rain  | - Surface Plane-of-Array Irradiance* (*in development) |
| - Surface visibility                   |  |  |

### Spire ADS-B Aircraft Tracking Data to Support Total Operational Picture

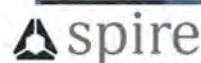
Spire Weather data can be easily paired with our ADS-B aircraft tracking data, providing UAS operators with a total operational picture of all aviation assets and weather conditions along their flight path or in their area of interest.



#### Available Spire tools provide operators with:

- Projected flight path of an aviation asset
- Distance in miles along path, and turbulence or other atmospheric conditions along the flight path at flight levels up to 70,000 feet

This type of data is critical for BVLOS, especially when crossing the ocean or in densely populated areas. Spire can provide operators with detailed forecasts that span flight levels to help avoid destruction of assets due to wind gusts or other unexpected weather conditions.



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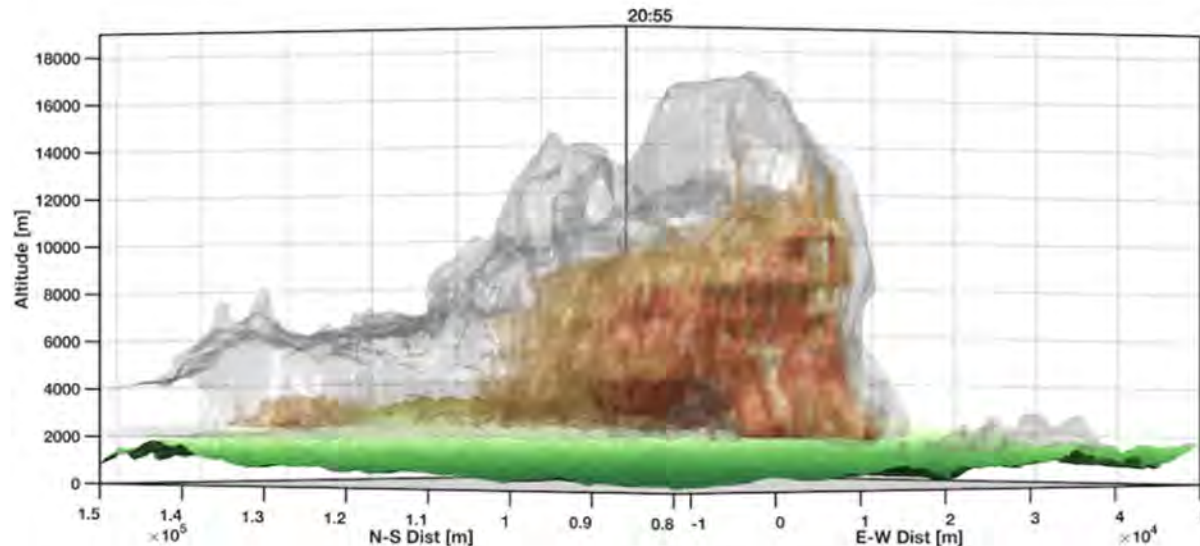




Capital Weather Gang

# California's wildfire smoke plumes are unlike anything previously seen

Smoke plumes have reached 55,000 feet in height, with embedded thunderstorms, lightning and possible tornadoes



A three-dimensional radar rendering of the Creek Fire at peak depth. (Neil Lareau/University of Nevada Reno)

By **Matthew Cappucci**





# WEATHER FORECAST ACCURACY ASSISTANCE



ERROR  
REDUCTION

20%

15%

10%

5%

JAN  
2020

FEB

MAR

APR

MAY

JUN

MWWV

MWT

IRT

**RADIO OCCULTATION**

Conv (no air)

**Aircraft**

SOURCE: EUROPEAN CENTRE for MEDIUM-RANGE WEATHER FORECASTS - AUG 2020





## Spire Wildfire Weather Forecast

### The Importance of Reading Wildfire Risks in Weather Forecasts

Blazes tore through four million acres in the West Coast so far this year, destroying thousands of structures and claiming lives from northern Washington to southern California. These extensive wildfires are part of an alarming trend of increasing wildfire size and ferocity that continued in 2020. Reversing this trend and restoring public safety will take collective action - and weather data can help.

### Most Common Wildfire Indicators - Hot, Dry, and Windy



**Temperature:** A certain amount of heat is required for ignition and continued burning - hotter fuel burns more readily and quickly

**Humidity:** Fires tend to ignite more easily and burn more intensely at relatively lower humidities

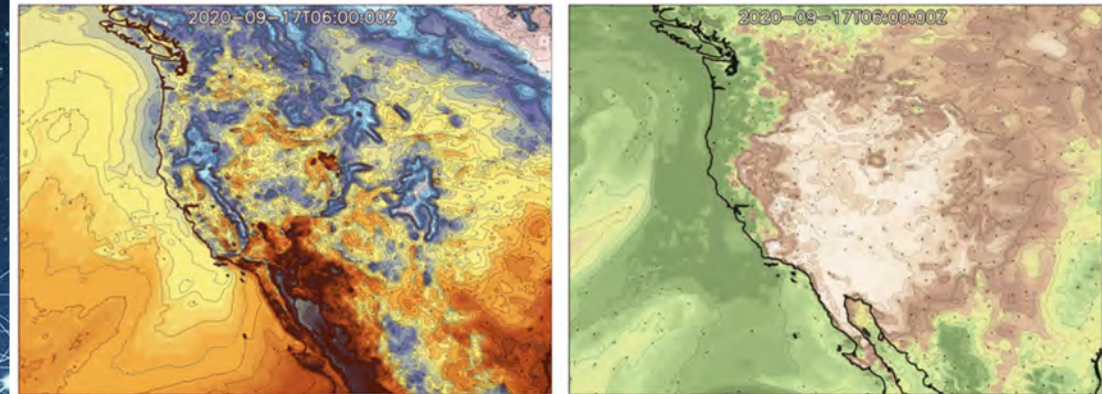
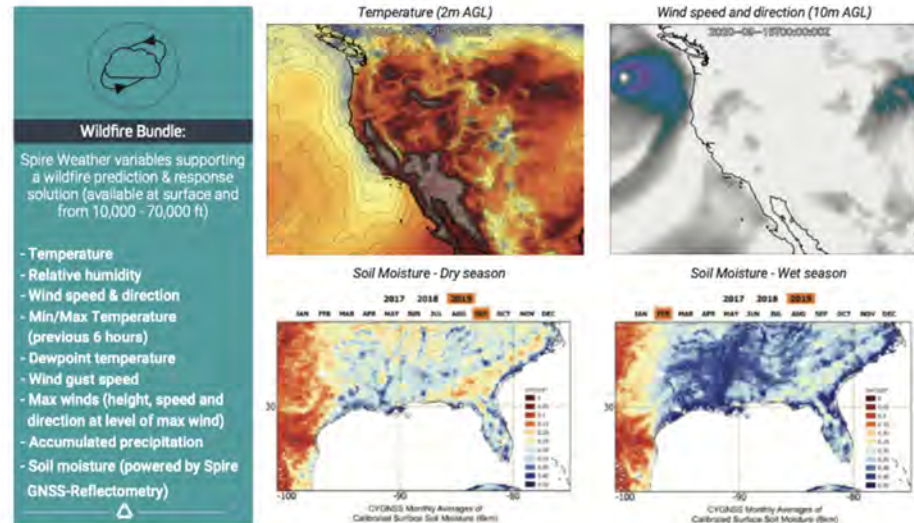


**Wind:** Wind heightens the danger of wildfires by drying out fuel and supplying oxygen to flames. Wind speed and direction also influence where and how far a fire might spread. Response teams also consider wind when planning how to deploy aerial assets.

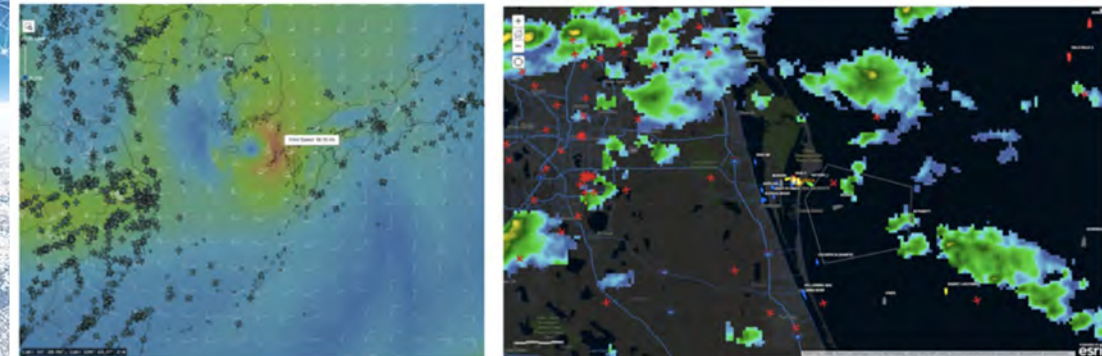
### Spire Weather Data - Customized Packages to Support Prediction and Response Efforts

Wildfire management teams need to know that the weather data they use is as precise as possible. That's why we recommend using weather forecasts powered by radio occultation data. Radio occultation offers ubiquitous and precise monitoring at a scale.

Spire's constellation of 100 satellites use this remote sensing technique to capture detailed temperature, humidity, and pressure information across the entire planet. Taking exact measurements around the world improves local forecasts since weather systems connect globally. It also ensures emergency management professionals and search and rescue teams have highly detailed forecasting across their operational regions, no matter how remote.



Temperature (2m AGL) and Relative Humidity (2m AGL)



ADS-B Data and Wind Speed & ADS-B Data and Weather Radar



**spire**

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#### Horizontal and Vertical Coverage

Available globally at 12 km resolution (1/8th degree). Covers the entire planet at the same high resolution. Data is collected at surface and from 10,000-70,000 ft, every 1,000 ft.

#### Short And Medium Range Forecast

Short-range forecast : hourly output for 24h  
Medium-range forecast : 6-hourly output for up to 10 days

<https://spire.com/>





# Thank You!

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